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(54) Title: **SUPERCRITICAL FLUIDS IN THE FORMATION AND MODIFICATION OF NANOSTRUCTURES AND NANOCOMPOSITES**

(57) Abstract: Embodiments of nanostructures and nanocomposites and embodiments of methods for forming and modifying these nanostructures and nanocomposites are disclosed. The methods can include transporting a metal, metallic compound or precursor to a surface of a nanostructure substrate in a carrier while the carrier is in supercritical fluid form. Embodiments of the disclosed methods can be used to form catalytic structures, such as catalytic structures including nanostructure supports and catalytic metallic nanoparticles attached to the nanostructure supports. These catalytic structures are useful for catalyzing reactions in fuel cell applications, such as oxygen reduction and methanol oxidation reactions. Some of the disclosed nanostructures and nanocomposites include carbon nanotubes.

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